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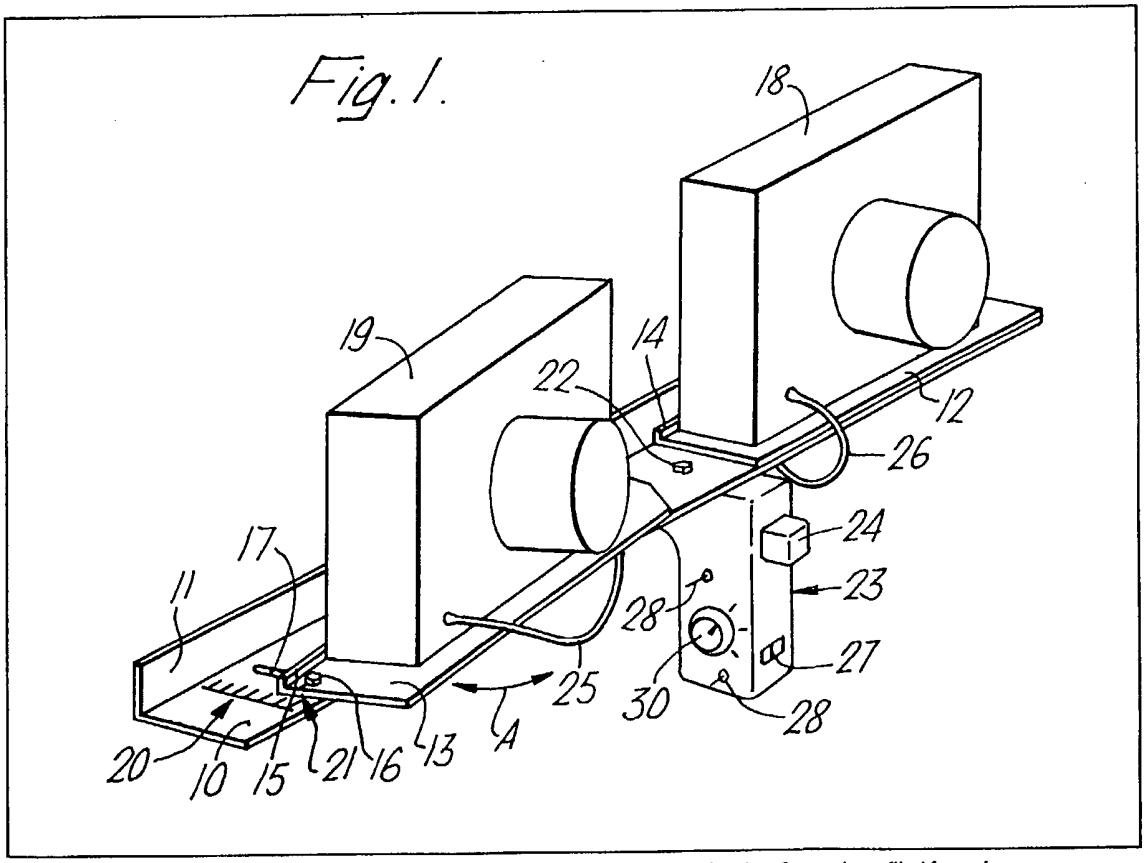
(54) **Camera mounting device**

(57) A camera mounting device comprises a base support 10 having a stationary mounting 12 for a first camera 18 and a pivotal mounting 13 for a second camera 19. The support 10 has a hand grip 23 with a camera actuation release button 24. The hand grip 23 contains electronic circuitry for controlling various modes of operation of the cameras including a controlled release of each camera in an alternating sequence. Control switches 27-30 for the electronic circuitry are also mounted on the hand grip.



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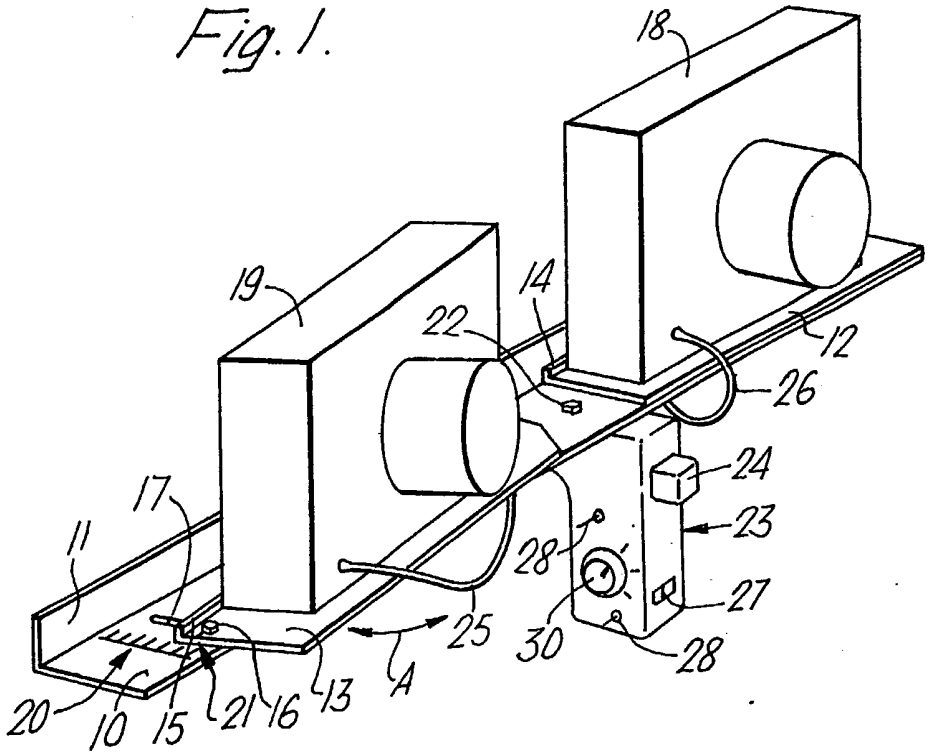
The drawing(s) originally filed was/were informal and the print here reproduced is taken from a later filed formal copy.

Fig. 1.



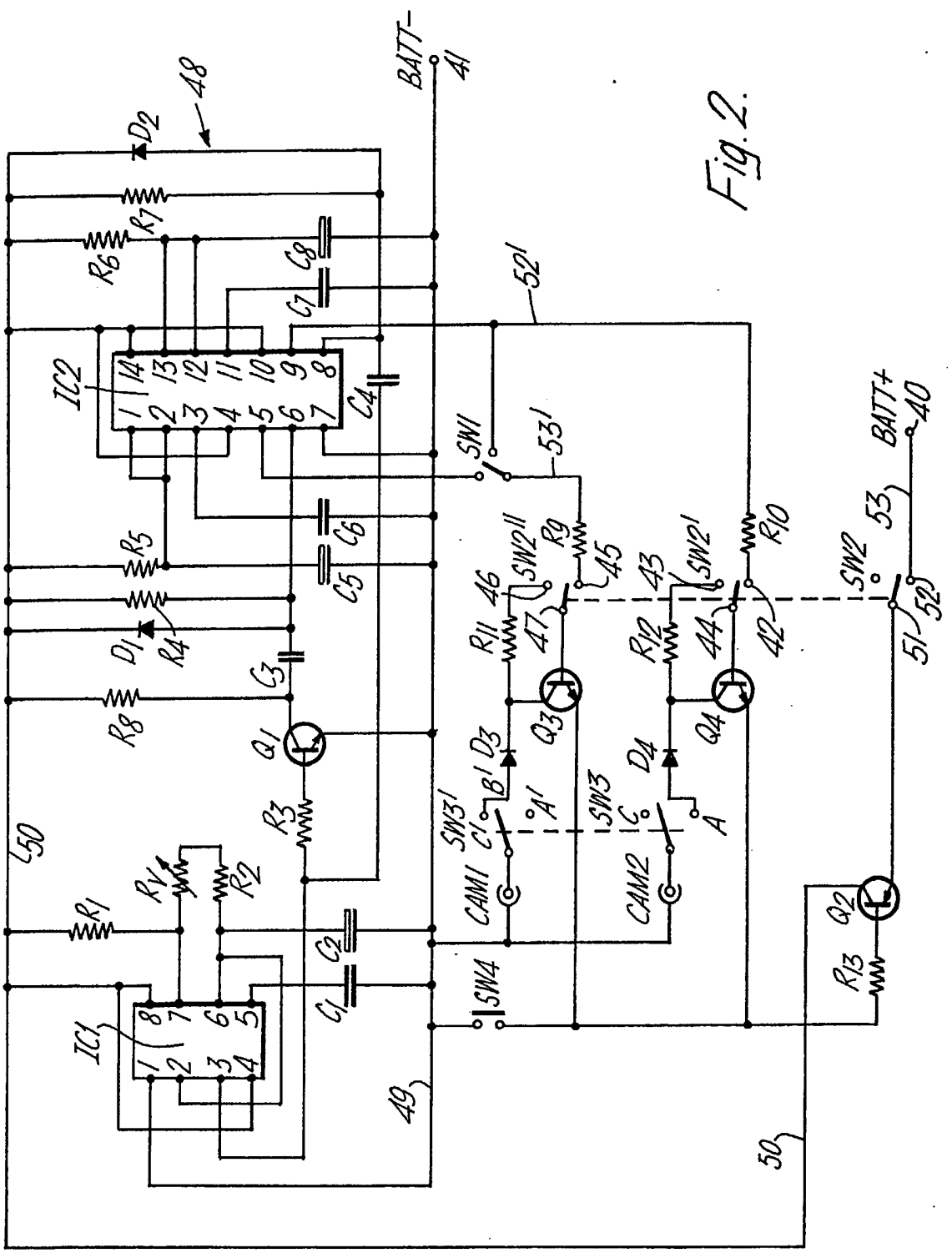

BATT-
41
48
D2
R7
R6
C8
C7
52'
IC2
14 13 12 11 10 9 8
1 2 3 4 5 6 7
C4
SW1
53'
R5
C6
C5
SW2''
R9
46
45
43
SW2'
R10
SW2
53
BATT+
40
D1
R4
C3
R11
47
R12
44
42
52
51
R8
Q1
Q3
Q4
D3
D4
B'
A'
SW3'
C'
SW3
C
A
50
R3
CAM1
CAM2
Q2
R1
RV
R2
C2
C1
SW4
R13
IC1
8 7 6 5
1 2 3 4
49
50

Fig. 2.

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Fig. 3.

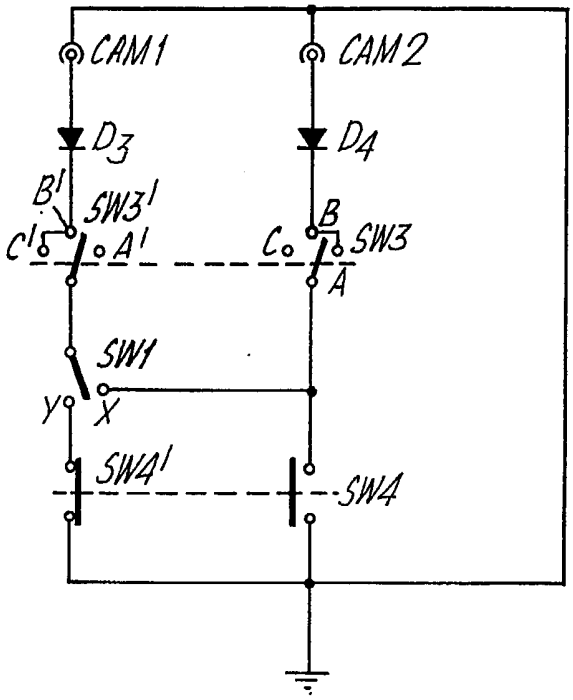
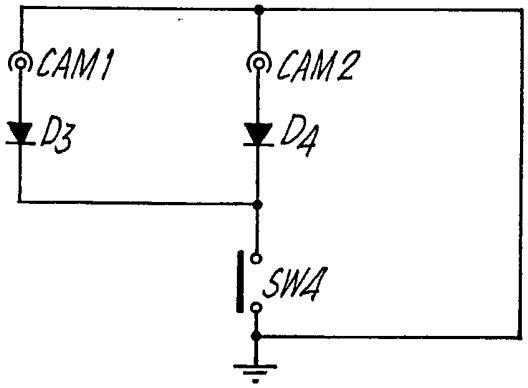


Fig. 4.



SPECIFICATION

Camera mounting device

The invention relates to a camera mounting device.

There are many circumstances where it is desirable to have the use of two cameras, particularly for action photography. A photographer, particularly a professional photographer, may wish to record the same incident using two different types of film stock, e.g. a fast and a slow film, a colour and a black and white film, a specialist and a quickly processed film, etc. It may also be desirable to use two separate cameras having different exposure settings. For recording action shots where motion past the photographer occurs, the photographer may wish to have a telephoto lens for capturing an approaching and/or retreating object and a wide angle lens for capturing the object as it passes close by the photographer. Furthermore a professional photographer may wish to use two cameras for recording one event for two separate clients.

Hitherto in such situations a photographer has used two cameras separately changing rapidly from one to the other as required, which can be particularly cumbersome for fast action situations. The invention seeks to provide a way of improving operation in the above mentioned circumstances.

The invention broadly provides a camera mounting device comprising a base support adapted to mount rigidly thereon, in use, a plurality of cameras (generally two) arranged side by side, means to hand hold the support and a common manually operable means for actuating the shutter release mechanisms of said plurality of cameras, which manually operable means are located on or adjacent said hand hold means so as to be readily operable when the mounting device is hand held.

In some embodiments, said manually operable means may be adapted to effect the release of two motor driven cameras at the individual speeds of the motors of the cameras. Therefore in use when the manually operable means are actuated both cameras continue making respective sequences of exposures governed by the motor drives of the respective cameras, until the manually operable means are released. Such an arrangement conveniently provides a way of operating the two cameras at the same time so that for example different films can be used to record a single incident or different exposures can be made. This system could also be used as a safeguard for recording unrepeatable action shots whereby there is a greater chance of obtaining acceptable prints using the two cameras rather then relying solely on a single camera. A further advantage is that this system provides a convenient means of producing stereoscopic pairs of photographs. Previous stereoscopic cameras employed two lenses in the same camera body and generally the lenses were not interchangable. However by using a camera mounting device according to the invention stereoscopic photography is possible with a wide variety of cameras without having to purchase separately a special stereoscopic camera and indeed the lenses are readily interchangable.

In further embodiments, said manually operable means may include electric circuit means comprising a selector switch which can be set to effect simultaneous operation of two motor driven cameras as mounted in use, on the support, or either one of said cameras, when the manually operable means is actuated. The advantages which can be obtained when operating the two cameras simultaneously are as set out above. The further advantages achieved by providing the switching mode for selecting one or other of the cameras separately is that it allows rapid switching from one camera to the other for example where one camera is fitted with a telephoto lens for photographing a more distant moving object and the other camera is fitted with a wide-angle lens for photographing that object as it passes the photographer.

In further embodiments, said manually operable means may include electronic circuit means adapted to produce outputs for effecting the controlled release of the respective camera shutters of cameras in use mounted on the device, when said manually operable means are actuated. Said circuit means may include a control switch for selecting operation of either of the two cameras or both cameras simultaneously. The control circuit means may be adapted to provide a regulated sequence of outputs for releasing the shutters on the cameras throughout the period of actuation of said manually operable means. Means may be provided in said circuit means for adjusting the time interval between successive outputs of the circuit means thereby altering the time interval between successive shutter operations. Further control means may be provided for directing said outputs of the circuit means so as to operate the shutters of the cameras either simultaneously or alternately in a continuous sequence which lasts for the duration of actuation of said manually operable means. In such embodiments said circuit means may include a pulse generator for producing, on actuation of said manually operable means, a sequence of pulses transmitted to operate the shutter release mechanisms of cameras, mounted in use on the device, with the cameras being released either simultaneously or alternately or only one camera being operated, as aforesaid. Said electronic circuit means may further include means bypassing said pulse generator to allow the shutter release mechanisms of the cameras to be operated at the maximum frequency allowed by the motor drive mechanisms of the respective cameras.

Embodiments of the invention incorporating said electronic circuit means have the advantageous modes of operation referred to above. However in addition the facilitity of operation of two cameras in a controlled sequence with the camera shutter release mechanisms being operated alternately provides an added advantage in that twice the number of exposures can be made per second in an action sequence as compared with a normal operation of a single similar motor drive camera. Therefore if two motor driven cameras each capable of operation at six frames per second are used it is possible to achieve a continuous sequence of shots with the rate of exposure being adjustable, as aforesaid, with a

maximum of twelve frames per second.

In embodiments of the invention, said base support may comprise a bar having projections for locating the bodies of a pair of cameras and screw mountings for the cameras. Various different screw mounting apertures can be provided at each camera location for accommodating a wide range of different types of cameras. The mounting for one camera on the support may be provided on a portion thereof which is relatively movable with respect to a mounting portion on the support for the other camera, the arrangement being such that the positions of the cameras can be adjusted for relatively close range situations so that both cameras are then pointing directly at the object being photographed. In such embodiments said one portion may be pivotally mounted on the support bar and a range scale may be provided to facilitate suitable adjustment in accordance with the position of the object to be photographed with respect to the cameras.

The means to hand hold the support of a camera mounting device according to the invention may take the form of a hand grip, e.g. of the "pistol" type, with said manually operable means including a "trigger" type release mounted on the hand grip. Said electronic circuit means may be mounted within said hand grip together with any battery where needed for operation of the electronic circuit means. The aforesaid control and switch means for controlling the various modes of operation of the electronic circuit means may also conveniently by mounted on the hand grip so that they are readily accessible. The hand grip is preferably provided with a screw for engagement in a threaded insert in the base support for the cameras to form a rigid intergrated assembly. With this arrangement the hand grip could also be detached from the base support which could then be mounted on a tripod and operated remotely by the hand grip using elongate electric cables for connecting the hand grip to cameras mounted on the base support.

Embodiments of the invention will now be described by way of example and with reference to the accompanying drawings in which:-

Figure 1 is a diagrammatic perspective view of a camera mounting device in accordance with the invention;

Figure 2 is a circuit diagram of an electronic control circuit including pulse generation means for controlling operation of a pair of cameras mounted on the device of Figure 1;

Figure 3 is a circuit diagram of an alternative control circuit for use with the device of Figure 1; and,

Figure 4 is a circuit diagram of another possible control circuit for use in the device of Figure 1.

Referring to Figure 1, a camera mounting device comprises a support beam (10) having an upwardly projecting flange (11) along its rear edge. A pair of camera mounting plates (12 & 13) are provided on the upper surface of the beam (10). Each plate (12, 13) has a shallow lip (14, 15) along one edge against which a lower back portion of the casing of a camera can be abutted for correctly locating the camera on the plate. The plate (12) is fixedly secured to the beam (10) with its lip (14) in abutment with the flange (11) on the base plate (10). The mounting plate (13) is pivotally mounted on the beam (10) for pivotal movement in the directions shown by the double headed arrow A. The free end of the plate (13) has a downwardly projecting pin (16) for sliding movement in an arcuate slot (17) in the beam (10) when the plate (13) is pivoted. The plate (13) has one extreme position in which its lip (15) is in abutment with the flange (11) on the base plate and in this position cameras (18, 19) mounted on the base plates (12 & 13) respectively point in parallel directions for use with relatively distant objects. When it is required to take photographs of relatively close objects the base plate (13) is pivoted to a suitable position in which the image of the object to be photographed is centrally disposed in the viewfinders of both cameras. Conveniently a range scale (20) is marked on the base plate (10) for cooperation with an indication mark (21) on the plate (13). Such an adjustment would be made for example in making stereoscopic pairs of photographs of a relatively close object.

A screw threaded insert (22) is provided in a central aperture in the beam (10) and a pistol-type hand grip (23) is rigidly attached to the beam by engaging a screw provided on the grip in the insert (22). Circuitry for controlling the operation, or modes of operation, of the cameras (as described below in relation to Figures 2 to 4) can be accommodated in the pistol grip (23) which has a protruding release control trigger (24) for operating the cameras through electric connecting cables (25, 26). Other control switches, (27, 28 & 29) as well as a rotary control (30) are also provided on the pistol grip for regulating various modes of operation when the electronic circuitry of Figure 2 is provided in the hand grip (23).

Referring to Figure 2, there is shown an electronic pulse generation circuit for controlling the operation of two cameras mounted on the support device of Figure 1 and actuated by operation of the trigger (24) of that device which is represented by switch SW4 in Figure 2. The circuit is powered by a battery, which can also be mounted in the hand grip (23), between terminal points (40 & 41). A power switch (SW2) corresponding to switch (29) shown in Figure 1, connectes or disconnects the battery to the pulse generation circuit. Switch SW2 is a ganged switch arrangement which in addition to controlling the power supplied to the circuit for operation of the pulse generation circuit to control the cameras, can be moved to a further position in which the gang switches SW2' and SW2" make a connection between terminals (43 & 44) and (46 & 47) respectively to the two motor drive cameras, which are connected by electric leads (25 & 26) from terminals "CAM 1" and "CAM 2" to then operate at their individual maximum rates governed by their own motor drives when the trigger switch SW4 is closed. Therefore depending on the position selected for switch SW2 the cameras will operate in a "passive" mode under the control of the pulse generation system of Figure 2 or an "active" mode at the maximum frequency allowed by their motor drives.

When switch SW2 selects the "passive" mode of operation the power supply connected between terminals (40) and (41) is applied to the pulse generation circuit generally indicated as (48) through rails (49) and (50) and by way of transistor Q_2. The switch SW2 then bridges contacts (51) and (52) in the supply line (53) from battery terminal (40). The transistor Q_2 is rendered conducting when the trigger switch SW4 is closed since the base of the transistor is then connected to supply line (49) from the battery terminal (41).

When power switch SW2 selects the "passive" mode and trigger switch SW4 is closed, a square wave generator IC1 is rendered operative. The frequency of the output of this generator is controlled by a variable resistor R_v and the setting of this resistor is made by altering the position of a rotary control member (30) (Figure 1) provided externally on the hand grip (23). The square wave output from generator IC1 is supplied as an input to a pair of monostable flip-flops designated IC2 which provide output pulses generated by the leading and trailing edges of the square wave output of generator IC1. The frequency of the pulses is therefore controlled by the setting of variable resistor R_v and hence by the setting of control member (30) e.g. to provide a range from 6 pulses/sec to one pulse every 15 secs.

The output pulses of the flip-flops IC2 are produced alternately at the terminals designated "5" and "9" thereof. These are fed through lines (51') and (52') for connection to one or other or both of the output terminals "CAM 1" and "CAM 2" for feeding to the respective cameras. Switch SW1, which can be mounted on the hand grip (23) and represented by switch (28) in Figure 1, can be moved between a position in which it connects pulse line (51') to input line (53') associated with the terminal "CAM 1" whereby the two camera output terminals "CAM 1" and "CAM 2" are connected respectively to output lines (51' and 52') of the flip-flop arrangement IC2 so that they receive respectively alternate output pulses therefrom. In this mode of operation the cameras are actuated in an alternating sequence.

Selector switch SW1 can be moved to a second position in which it connects line (53') to output line (52'). In this mode of operation both camera outputs "CAM 1" and "CAM 2" are connected to the same output line (52') from the flip-flop assembly IC2 whereby both cameras are released simultaneously.

A further three position ganged switch SW3 and SW3' is provided in the connections between the camera output sockets "CAM 1" and "CAM 2" and the transistors Q_3 and Q_4 as a means of selecting which camera or cameras will function when the trigger switch SW4 is operated. In this way when the switch SW3 and SW3' is selected to position AA', terminal "CAM 2" is connected to its transistor and terminal "CAM 1" is unconnected; when selected to position BB' both terminals "CAM 2" and "CAM 1" are connected to their transistors, and when to position CC' terminal "CAM 1" is connected and terminal "CAM 2" disconnected. This switch may be operated while the device is continuously functioning, such as when the two cameras are fitted with lenses of different focal lengths in order to photograph a passing object both when distant and when close by, as previously described.

Figure 3 shows an alternative control circuit for use with the camera mounting structure of Figure 1 which does not include the switching transistors or the pulse generation circuit, so that a separate battery power supply for operating the control circuit is not required. The basic connections between the trigger switch SW4 and the camera output terminals "CAM 1" and "CAM 2" are similar to those described in Figure 2, and the function of the switches SW1, SW3, SW3' and SW4 are unchanged; the same reference numerals have therefore been used for the same parts. In this embodiment therefore, when switch SW1 is selected to position X, operation of the trigger switch SW4 causes either or both cameras to operate at the maximum frequencies allowed by their respective motor drive, the selection made at ganged switch SW3 and SW3' determining which camera or cameras will function. Switch SW4' is introduced in order to retain the mode of operation in which the cameras may be operated alternately. Switch SW4' is ganged to switch SW4 but operates when the trigger is in the released position. For this alternate mode switch SW3 and SW3' must be selected to position BB' and switch SW1 to position Y. Additionally the function selector on the camera motor drives should be in the single shot position, i.e. each camera operates once each time a connection is made to its terminal. In this way, when the trigger is alternately depressed and released, switches SW4 and SW4' will be operated causing repeated alternate connections to be made to terminals "CAM 2" and "CAM 1" respectively.

Figure 4 shows another circuit in which no selector switch SW3 is provided so that operation of the trigger switch SW4 always results in both cameras operating at their maximum frequencies as governed by their respective motor drives.

CLAIMS

1. A camera mounting device comprising a base support adapted to mount rigidly thereon, in use, a plurality of cameras arranged side by side, means to hand hold the support and a common manually operable means for actuating the shutter release mechanisms of said plurality of cameras, which manually operable means are located on or adjacent said hand hold means so as to be readily operable when the mounting device is hand held.

2. A device as claimed in Claim 1 wherein said manually operable means are adapted to effect the release of two motor driven cameras at the individual speeds of the motors of the cameras.

3. A device as claimed in any preceding claim wherein said manually operable means includes electric circuit means comprising a selector switch which can be set to effect simultaneous operation of two motor driven cameras mounted in use, on the support, or either one of said cameras, when the manually operable means is actuated.

4. A device as claimed in any preceding claim wherein said manually operable means include electronic circuit means adapted to produce outputs

for effecting the controlled release of the respective camera shutters of cameras, in use, mounted on the device, when said manually operable means are actuated.

5. A device as claimed in Claim 4 wherein said circuit means include a control switch for selecting operation of either of the two cameras or both cameras simultaneously.

6. A device as claimed in Claim 4 or Claim 5 wherein the control circuit means is adapted to provide a regulated sequence of outputs for releasing the shutters on the cameras throughout the period of actuation of said manually operable means.

7. A device as claimed in Claim 6 wherein means are provided in said circuit means for adjusting the time interval between successive outputs of the circuit means thereby altering the time interval between successive shutter operations.

8. A device as claimed in Claim 6 or Claim 7 wherein further control means are provided for directing said outputs of the circuit means so as to operate the shutters of the cameras either simultaneously or alternately in a continuous sequence which lasts for the duration of actuation of said manually operable means.

9. A device as claimed in any of Claims 4 to 8 wherein said circuit means include a pulse generator for producing, on actuation of said manually operable means, a sequence of pulses transmitted to operate the shutter release mechanisms of cameras, mounted in use on the device, with the cameras being released either simultaneously or alternately or only one camera being operated, as aforesaid.

10. A device as claimed in any of Claims 4 to 9 wherein said electronic circuit means further include means bypassing said pulse generator to allow the shutter release mechanisms of the cameras to be operated at the maximum frequency allowed by the motor drive mechanisms of the respective cameras.

11. A device as claimed in any preceding claim wherein said base support comprises a bar having projections for locating the bodies of a pair of cameras and screw mountings for the cameras.

12. A device as claimed in any preceding claim wherein the mounting for one camera on the support is provided on a portion thereof which is relatively movable with respect to a mounting portion on the support for the other camera, the arrangement being such that the positions of the cameras can be adjusted for relatively close range situations so that both cameras are then pointing directly at the object being photographed.

13. A device as claimed in Claim 12 wherein said one portion is pivotally mounted on the support bar.

14. A device as claimed in Claim 13 wherein a range scale is provided to facilitate suitable adjustment in accordance with the position of the object to be photographed with respect to the cameras.

15. A device as claimed in any preceding claim wherein the means to hand hold the support is in the form of a hand grip with said manually operable means including a "trigger" type release mounted on the hand grip.

16. A device as claimed in Claim 15 when dependent on any of Claims 4 to 10 wherein said electronic circuit means are mounted within said hand grip together with any battery where needed for operation of the electronic circuit means.

17. A device as claimed in Claim 16 wherein the aforesaid control and said switch means for controlling the various modes of operation of the electronic circuit means are also mounted on the hand grip so that they are readily accessible.

18. A device as claimed in any of Claims 15 to 17 wherein the hand grip is detachably connected to the base support for the cameras.

19. A camera mounting device substantially as hereinbefore described with reference to, and as illustrated in, the accompanying drawings.

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